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**Claims**

1. Processing system for one or more communication networks with middleware comprising an application programming interface (102) cast over a data model describing quality-of-service contracts and quality-of-service adaptation paths as specified by quality-of-service aware mobile multimedia applications (101) using said application programming interface, in order to manage quality-of-service and mobility-aware network connections with other applications.
2. Processing system according to claim 1,  
**characterized in,**  
that the adaptation paths are expressed as hierarchical finite state machines based on quality-of-service contexts.
3. Processing system according to claim 2,  
**characterized in,**  
that a quality-of-service context identifies an arrangement of quality-of-service specifications to be enforced throughout a given set of streams.
4. Processing system according to claim 2 or 3,  
**characterized in,**  
that the hierarchical finite state machines comprise controllable states in the context of streams at the lowermost level.
5. Processing system according to claim 2, 3 or 4,  
**characterized in,**  
that quality-of-service synchronisation is provided so as to ensure that some user's given constraints on quality-of-service are globally enforced throughout a given set of streams.
6. Processing system according to one of the claims 1 to 5,  
**characterized in,**  
that the specification of the quality-of-service contracts comprises hysteresis parameters for the transition between quality-of-service states.
7. Processing system according to one of the claims 1 to 6,

**characterized in,**

that the specification of the quality-of-service contracts comprises utility parameters defining user's perceived utility factors associated with the respective quality-of service contract.

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8. Processing system according to one of the claims 1 to 7,

**characterized by**

an application handler unit (104) offering said application programming interface (102) for providing quality-of-service aware mobile multimedia applications (101) with the possibility of managing network connections with other applications.

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9. Processing system according to claim 8,

**characterized in,**

that the application handler unit (104) registers requests for notification events from applications and generates such events whenever the corresponding triggering conditions occur.

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10. Processing system according to claim 8 or 9,

**characterized in,**

that the application handler unit (104) operates on the basis of a data model comprising streams, quality-of-service context, quality-of-service associations and adaptation paths modeled as hierarchical finite state machines.

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11. Processing system according to claim 10,

**characterized in,**

that the application handler unit (104) creates for each unidirectional stream an instance of a chain controller (109) for handling data plane and quality-of-service control plane related issues.

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12. Processing system according to claim 11,

**characterized in,**

that the chain controller (109) compares the quality-of-service requirements of a user with actual values of monitored parameters and configures a chain of multimedia components (112, 113, 114) accordingly.

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13. Processing system according to claim 12,

**characterized in,**

that the chain controller (109) creates and manages a transport service interface socket (111), whereby said multimedia components (112, 113, 114) directly exchange data through said transport service interface socket (111).

- 5     14. Processing system according to claim 11, 12 or 13,  
**characterized in,**  
 that the chain controller (109) monitors and controls the local resources required to process the given stream by using resource managers (110).
- 10    15. Processing system according to one of the claims 11 to 14,  
**characterized by**  
 a quality-of-service broker (106) for managing overall local resources by managing the whole set of streams via the chain controllers (109).
- 15    16. Processing system according to claim 15,  
**characterized in,**  
 that the quality-of-service broker (106) manages system-wide resources via resource controllers (115).
- 20    17. Processing system according to claim 15 or 16,  
**characterized in,**  
 that the quality-of-service broker (106) controls end-to-end quality-of-service negotiation by using a session manager (116).
- 25    18. Processing system according to claim 15, 16 or 17,  
**characterized in,**  
 that the quality-of-service broker (106) includes further functionality for downloading plug-ins (107) corresponding to a given version of a data model which can not be handled by the application handler unit (104).
- 30    19. Processing system according to claim 18,  
**characterized in,**  
 that the quality-of-service broker (106) and the plug-ins (107) are forming a quality-of-service broker cluster (105).
- 35    20. Processing system according to one of the claims 11 to 19,  
**characterized in,**  
 that the application handler unit (104) and the various instances of the chain controller (109) are forming an application handler cluster (103).

21. Processing system according to claim 19 or 20,  
**characterized in,**  
that the application handler cluster (103) and the quality-of-service broker cluster (105)  
5 are included in one open distributed processing capsule.
22. Processing system according to claim 19 or 20,  
**characterized in,**  
that the application handler cluster (103) and the quality-of-service broker cluster (105)  
10 are included in separate open distributed processing capsules.
23. Processing system according to claim 22,  
**characterized in,**  
that the application handler cluster (103) being included in one open distributed  
15 processing capsule is installed on a given local node and the quality-of-service broker  
cluster (105) being included in separate open distributed processing capsule is installed  
on a separate open distributed processing node, whereby a proxy quality-of-service  
broker is installed on the given local node.
- 20 24. Pieces of software for one or more communication networks, being loadable in one  
or more memory means of one or more processing devices or nodes of said one or more  
communication networks, representing middleware comprising an application  
programming interface (102) cast over a data model describing quality-of-service  
contracts and quality-of-service adaptation paths as specified by quality-of-service aware  
25 mobile multimedia applications (101) using said application programming interface, in  
order to manage quality-of-service and mobility-aware for managing network  
connections with other applications.
25. Pieces of software according to claim 24,  
30 **characterized in,**  
that the adaptation paths are expressed as hierarchical finite state machines based on  
quality-of-service contexts.
26. Pieces of software according to claim 25,  
35 **characterized in,**  
that a quality-of-service context identifies an arrangement of quality-of-service  
specifications to be enforced throughout a given set of streams.
27. Pieces of software according to claim 25 or 26,

**characterized in,**

that the hierarchical finite state machines comprise controllable states in the context of streams at the lowermost level.

5 28. Pieces of software according to claim 25, 26 or 27,

**characterized in,**

that quality-of-service synchronisation is provided so as to ensure that some user's given constraints on quality-of-service are globally enforced throughout a given set of streams.

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29. Pieces of software according to one of the claims 24 to 28,

**characterized in,**

that the specification of the quality-of-service contracts comprises hysteresis parameters for the transition between quality-of-service states.

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30. Pieces of software according to one of the claims 24 to 29,

**characterized in,**

that the specification of the quality-of-service contracts comprises utility parameters defining user's perceived utility factors associated with the respective quality-of-service contract.

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31. Pieces of software according to one of the claims 24 to 30,

**characterized by,**

an application handler unit (104) offering said application programming interface (104) for providing quality-of-service aware mobile multimedia applications (201) with the possibility of managing network connections with other applications.

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32. Pieces of software according to claim 31,

**characterized in,**

30 that the application handler unit (104) registers requests for notification events from applications and generates such events whenever the corresponding triggering conditions occur.

33. Pieces of software according to claim 31 or 32,

35 **characterized in,**

that the application handler unit (104) operates on the basis of a data model comprising streams, quality-of-service context, quality-of-service associations and adaptation paths modeled as hierarchical finite state machines.

34. Pieces of software according to claim 33,  
**characterized in,**  
 that the application handler unit (104) creates for each unidirectional stream an instance  
 of a chain controller (109) for handling data plane and quality-of-service control plane  
 5 related issues.

35. Pieces of software according to claim 34,  
**characterized in,**  
 that the chain controller (109) compares the quality-of-service requirements of a user  
 10 with actual values of monitored parameters and configures a chain of multimedia  
 components (112, 113, 114) accordingly.

36. Pieces of software according to claim 35,  
**characterized in,**  
 15 that the chain controller (109) creates and manages a transport service interface socket  
 (111), whereby said multimedia components (112, 113, 114) directly exchange data  
 through said transport service interface socket (111).

37. Pieces of software according to claim 34, 35 or 36,  
 20 **characterized in,**  
 that the chain controller (109) monitors and controls the local resources required to  
 process the given stream by using resource managers (110).

38. Pieces of software according to one of the claims 34 to 37,  
 25 **characterized by**  
 a quality-of-service broker (106) for managing overall local resources by managing the  
 whole set of streams via the chain controllers (109).

39. Pieces of software according to claim 38,  
 30 **characterized in,**  
 that the quality-of-service broker (106) manages system-wide resources via resource  
 controllers (115).

40. Pieces of software according to claim 38 or 39,  
 35 **characterized in,**  
 that the quality-of-service broker (106) controls end-to-end quality-of-service  
 negotiation by using a session manager (116).

41. Pieces of software according to claim 38, 39 or 40,

**characterized in,**

that the quality-of-service broker (106) includes further functionality for downloading plug-ins corresponding to a given version of a data model which can not be handled by the application handler unit (104).

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42. Pieces of software according to claim 41,

**characterized in,**

that the quality-of-service broker (106) and the plug-ins (107) are forming a quality-of-service broker cluster (105).

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43. Pieces of software according to one of the claims 34 to 42,

**characterized in,**

that the application handler unit (104) and the various instances of the chain controller (109) are forming an application handler cluster (103).

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44. Pieces of software according to claim 42 or 43,

**characterized in,**

that the application handler cluster (103) and the quality-of-service broker cluster (105) are included in one open distributed processing capsule.

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45. Pieces of software according to claim 42 or 43,

**characterized in,**

that the application handler cluster (103) and the quality-of-service broker cluster (105) are included in separate open distributed processing capsules.

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46. Pieces of software according to claim 45,

**characterized in,**

that the application handler cluster (103) being included in one open distributed processing capsule is installed on a given local node and the quality-of-service broker cluster (105) being included in separate open distributed processing capsule is installed on a separate open distributed processing node, whereby a proxy quality-of-service broker is installed on the given local node

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